Tokyo Climate Change Strategy

- A Basic Policy for the 10-Year Project for a Carbon-Minus Tokyo -

June 2007

Tokyo Metropolitan Government

This “Tokyo Climate Change Strategy” defines a basic policy for the “10-Year Project for a Carbon-Minus Tokyo,” an ambitious undertaking launched by Tokyo Metropolitan Government at the end of January 2007. It spells out a basic framework of climate change mitigation strategies that Tokyo Metropolitan Government intends to carry out over the next ten years. Representative measures designed to cope with climate change are identified in this strategy.

This policy specifies the direction in which TMG climate change mitigation strategies should be pushed forward, based on the details of a study that the Tokyo Metropolitan Environment Council had conducted since the previous year, as well as on an interim report submitted by the Council, in preparation for a revision to the Tokyo Metropolitan Environmental Master Plan.

Contents

Target Tokyo Is Seeking to Accomplish

- 10-Year Project for a Carbon-Minus Tokyo

Avoiding a possible global crisis that may be caused by climate change requires us to reduce global warming or greenhouse gas emissions across the world by half by the middle of the current century.

To this end, Japan, the European Union, the United States and other industrialized nations must reduce greenhouse gas emissions not by 50% but should achieve dramatic 60-80 % reductions in greenhouse gas emissions. What we aim to achieve is to realize a new city model in the 21st century that could accomplish such dramatic gas reductions in Tokyo without delay.

City Model Tokyo Aims to Create

- A new look at how energy should be used in cities results in a shift toward a low-CO_2 society – a low-energy society – that allows people to lead an affluent, comfortable urban life while spending the minimum required amount of energy. Low-CO_2 social systems and technologies that make this society possible become widespread throughout Tokyo's urban society, thus minimizing the greenhouse gas emissions from the Metropolis.
- While the optimum use of energy in a manner befitting the characteristics of demand progresses, renewable energies such as solar energy and unutilized energy from urban waste heat are increasingly put to effective use, thereby enhancing Tokyoites' independence in terms of energy.
- Progress is made in the passive use of energy that uses natural light, wind and heat as they are, particularly in homes, and the city architecture that not only considers the performance of a building but also cares deeply about the relationship between buildings, the relations between structures and greenery around them, and local microclimate is being pushed forward.
- The development and subsequent spread of low-CO_2 social systems and technologies are creating a new urban-style business. These social systems, technologies and lifestyles that minimize environmental burden enhance the charm of Tokyo as a city, which spreads as a trailblazing city model that continues to be chosen by people and business enterprises in competition among cities across the world.

A GHG Reduction Target Under the 10-Year Project for a Carbon-Minus Tokyo

In an effort to realize such a city model as soon as possible, Tokyo Metropolitan Government focuses its efforts on achieving the following numerical targets under the 10-Year Project for a Carbon-Minus Tokyo:

Reduce Tokyo's greenhouse gas emissions by 25% from the 2000 level by 2020.

Basic Recognition of Climate Change and the Significance of Formulating Climate Change Strategies

■ Basic Recognition of Climate Change

○ The Most Serious Environmental Problem Caused by Human Activities

The Intergovernmental Panel on Climate Change's (IPCC) 4th Assessment Report, which was released between February and May this year, asserts that warming of the climate system is now in progress and clearly points out that as is evidenced by unusual weather phenomena such as heat waves, drought and increased precipitation, the melting of glaciers and Arctic ice, and rising sea levels, global warming is progressing at an accelerated tempo. It is beyond doubt that global warming makes a global climate crisis a reality.

Climate change is the most serious environment concern that faces human beings as it threatens all things that form the foundation of life for people around the world, causing numerous problems such as the frequent occurrence of unusual weather phenomena, difficulty of food production, depletion of drinking water, and the loss of inhabitable land due to the rising sea. And it is apparently clear that this climate change is caused by greenhouse gases, including CO_2, produced by the combustion of large amounts of fossil fuels that are consumed by human beings.

○ "Clear and Present Crisis" Facing Tokyo Metropolis

Tokyo's urban activities are dependent on enormous amounts of resources being provided by suppliers, domestic and foreign. As such, a global climate crisis inevitably poses a direct threat to Tokyo's very existence. As it has large seaside and coastal areas, the Metropolis may be more vulnerable to the effects of global warming such as a rise in sea levels.

A crisis caused by climate change is not a future crisis that may confront the coming generations but it should be taken as a clear and present crisis that may have a direct impact on the lives, property and health of today's Tokyoites.

○ The Next Decade Determines the Future of the Earth

The amount of world's CO_2 emissions must be changed to a decreasing tendency by 2015-2020.

The IPCC's 4th Assessment Report points out that a rise of 2-3℃ or more in the average global temperature from the 1990 level is highly likely to produce adverse effects in almost all areas of the world. It also emphasizes the need to turn the world's CO_2 emissions downward by 2015-2020.

The next decade represents a crossroad at which our generations living today may or may not be able to hand the present global environment over to the coming generations. We don't have ample time to spare. We must start taking action now to achieve substantial greenhouse gas reductions.

■ The Significance of Formulating Climate Change Measures

○ Turn Tokyo's CO_2 Emissions Downward Without Delay

Per capita CO_2 emissions in Tokyo are 20-30% lower than in New York and London. Tokyo is now already achieving the highest level of energy efficiency among big cities in advanced countries.

However, Tokyo's CO_2 emissions are still showing an increasing tendency. In order to achieve the reduction target established by "Tokyo's Big Change – The 10-Year Plan" and in order to realize a full-scale low-CO_2 city looking far ahead into the middle of the 21st century, we must change Tokyo's CO_2 emissions to a clear decreasing tendency without delay.

Tokyo with a relatively high level of energy efficiency leads major cities in the world in climate change mitigation measures by launching activities designed to achieve further substantial reductions in CO_2 emissions.

○ TMG Advances Pioneering Strategies on Behalf of the Japanese Government Unable to Come Up with Effective and Specific Measures

– TMG Takes the Lead in Japan's Climate Change Mitigation Measures

Essentially it is the Japanese government's primary responsibility to carry out climate change mitigation measures. Fundamentally the Japanese government should come forward with a national-level strategic policy and targets to address the climate change issue. However, the Japanese government fails to come up with medium and long-term reduction targets or effective and specific measures.

In order to step up measures to cope with climate change, which can afford no further delay, Tokyo Metropolitan Government advances the world's highest level strategies in this "Tokyo Climate Change Strategy" on behalf of the Japanese government and takes the lead in Japan's climate change mitigation measures.

○ Advance Clear Policy to Excite Public Opinion and Implement Strategies

By advancing this climate change strategy, TMG arouses public opinion on climate change mitigation measures extensively and, based on the views of numerous companies, Tokyoites, NGOs and business operators, give shape to climate change mitigation measures. Moreover, the TMG will endeavor to implement these measures through diverse measures, including carrying out projects in collaboration with various entities, entering into agreements with them, and enacting necessary ordinances.

A Basic Policy for Climate Change Mitigation Strategy

- TMG's Stance Toward Climate Change Mitigation

Create a Mechanism Whereby to Bring Japan's Environmental Technologies Into Full Play to Achieve CO_2 Reductions

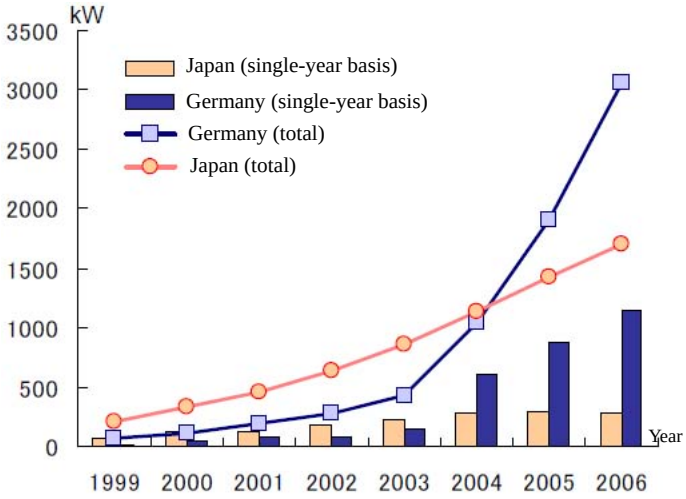
Facilitate a shift to a low-energy and low-CO_2 society by making the most of the private sector's technologies.

Japan already has outstanding environmental technologies in which we can take pride to the rest of the world, such as: highly efficient energy systems and equipment, LED and other lighting technologies, fuel-efficient vehicles represented by hybrid cars, and photovoltaic power generation systems capable of supplying half the world's current production. In order to reduce CO_2 emissions promptly and substantially, we must create a mechanism that allows these existing environmental technologies to be fully utilized and enables them to display their potentials to the full.

However, the reality is that these environmental technologies are not fully utilized. On the contrary, photovoltaic power generation technology, for instance, has come in wide use rapidly in Germany and other countries, whereas housing market remains stagnant in this country.

TMG intends to create a mechanism that derives the most from Japan's reputed environmental technologies in order to achieve a shift to a low-energy and low-CO_2 city.

BOX : Japan's Installed Photovoltaic Power Generation Capacity Outperformed by Germany



(Source: Prepared by the Bureau of the Environment, Tokyo Metropolitan Government, based on the Trends in Photovoltaic Applications/IEA/PVPS.)

Create a Mechanism Whereby to Allow Large Businesses, Smaller Businesses and Households to Achieve CO2 Reductions in Their Own Capacities and on Their Own Responsibility

- All parties endeavor to achieve CO_2 reductions in their own ways. * Create a mechanism that is mutually beneficial.

There is no single panacea for climate change mitigation.

CO_2 is produced from the consumption of energy that occurs in any and all aspects of urban activities and urban life and not only business activities but also each one of the Tokyoites' lifestyles are contributing a great deal to climate change, or global warming for that matter. Accordingly, in order to achieve substantial CO_2 reductions, any and all parties in Tokyo –

Tokyoites, business enterprises, and government agencies – must commit themselves to reduce CO_2 emissions in their own capacities and on their own responsibility.

Large CO_2-emitting big business corporations, among others, are required to take the initiative in achieving CO_2 reductions and devote their efforts to the development and spread of lower-energy and lower-CO_2 products.

On the other hand, smaller businesses that number approximately 600,000 establishments in Tokyo are generally lagging behind in their efforts to reduce CO_2 emissions due to the lack of knowledge of energy conservation measures as well as to insufficiency of funds to invest in energy-saving systems. We will provide appropriate technologies and information to these smaller businesses and support them in acquiring funds to cover necessary initial expenses in order to encourage them to invest in energy-conserving technologies and equipment that lead to reductions in fuel and light expenses.

Households are yet to start an effort to achieve CO_2 reductions in earnest. Households are encouraged to implement independent activities on clear understanding that reductions in electricity and gas charges directly result in CO_2 reductions and some incentive measures should be taken to help them introduce equipment that entail higher initial costs.

Carry Out Measures Strategically and Intensively During the Period of the First 3-4 Years as the Initial Period of a Shift to a Low-CO2 Society

Achieving the reduction target by 2020 requires a changeover in urban activities at an early date.

In order to achieve the reduction target by 2020, the lifestyles of the parties who make up this city must be changed and economic and urban activities should be changed over to those low-CO_2 activities through a set of measures, such as the application of the latest energy-saving technologies in each and every corner of society, and the extensive diffusion of renewable energies.

Ensuring this changeover requires the intensive introduction of energy-saving systems and renewable energies and a large-scale campaign to arouse public opinion, thereby solidifying a move toward a low-CO_2 society. To this end, we will take measures designed to reduce CO_2 emissions strategically and intensively during the period of the first three-to-four years as the initial period of a shift to a low-CO_2 society.

Utilize Private and Public Funds and Tax Incentives, and Carry Out Necessary Investment Boldly

Appropriate necessary expenses boldly to essential measures for a shift to a low-CO_2 society.

A low-CO_2 society is a society that allows us to lead urban life and conduct urban activities with as small energy as realistically possible. It is an efficient society that entails less energy costs than now. However, a shift to such a society requires covering huge initial costs needed to introduce large capacities of energy-saving technologies and to achieve the widespread use of renewable energies that are still expensive.

Tokyo Metropolitan Government will create a mechanism that enables us to acquire necessary initial funds and make necessary investments through diverse measures such as collaboration with financial institutions, the utilization of the Fund to Promote Measures against Climate Change, and the use of tax incentives. Through these and other measures we invest necessary funds in pioneering strategies to achieve a shift to a low-CO_2 society.

Five Initiatives and Main Activities for Climate Change Mitigation

Based on the long-term target that avoiding a possible global crisis caused by climate change requires us to reduce greenhouse gas emissions across the world by half by the middle of the current century, one of the most important considerations in formulating climate change strategies in Tokyo is that we should define the direction of policy measures to be carried out at the present moment in order to realize a new city model that enables us to achieve such remarkable greenhouse gas reductions.

Viewed from this perspective, we are now required to take a new look at the present energy demand, transform the existing social systems, including lifestyles, urban architectures and buildings, and thereby to achieve a shift to a city that allows us to lead a comfortable life with as small energy as possible.

As a first step toward achieving a shift to such a society, efforts must be made to promote the full utilization of energy-saving technologies and renewable energies and the segments that make up the city should endeavor to surely reduce the total emissions of CO_2 and other greenhouse gases produced by urban activities.

An endeavor to turn Tokyo to a low-CO_2 society is based on the following two principles:

- **First, we will strive to reduce energy consumption through the complete implementation of energy conservation measures as well as through the passive utilization of energy, such as natural light and wind (to create a low-energy society).**
- **Secondly, we will strive to use renewable energies and unutilized energies in a positive manner.**

Initiative I: Promote Private Enterprises' Efforts to Achieve CO_2 Reductions

CO_2 emissions resulting from corporate activities in the business and industrial sectors in Tokyo account for more than 40% of the city's total emissions and, as such, stepping up measures in these sectors is crucial in achieving reductions in the total emissions of greenhouse gases in the Metropolis. With this in mind, we will create a mechanism designed to achieve the widespread use of the latest energy-saving measures and renewable energies and provide enhanced support particularly for smaller businesses in their efforts to achieve CO_2 reductions.

○ Introduce Cap & Trade System Targeting Large CO2-Emitting Business Establishments

- Business establishments that produce large greenhouse gas emissions are required to take the initiative in actively reducing emissions.
- Starting in April 2005, Tokyo has inaugurated the nation's first initiative called the Tokyo CO_2 Emission Reduction Program under the Tokyo Metropolitan Environment Security Ordinance in which large greenhouse gas-emitting business establishments are required to submit and announce a five-year greenhouse gas reduction plan and this plan is evaluated, rated and announced.
- Because Tokyo Metropolitan Government has provided effective guidance on standard measures that can be carried out at all business establishments, almost all the business establishments have successfully upgraded their own greenhouse gas reduction measures. In addition, the introduction of the evaluation and announcement program has helped some business establishments formulate their own greenhouse gas reduction measures, including the introduction of high-efficiency equipment, in a positive manner (Business establishments that have gained AA ratings account for one-fourth of the total).
- On the other hand, there is much room for reductions at about three-fourths of the business establishments that have gained A and A+ ratings, because they have so far attained a relatively lower rate of gas reductions. Reduction targets of these business establishments during the planned period remained at 3-4% on the average.
- In order to step up climate change mitigation measures being taken by business establishments in Tokyo, the results of the existing program must be used to further enhance business establishments' efforts toward greenhouse gas reductions and to upgrade activities of all the business establishments to the top runner's level of measures designed to continuously achieve total emission reductions. To this end, we will require large CO_2-emitting business establishments to reduce the total emission of greenhouse gases and introduce the emission trading system.
- Under the emission trading system we will promote not only transactions between large business establishments but we will also allow large business establishments to purchase reductions achieved by smaller business establishments through energy conservation measures. In so doing, we will enable smaller business establishments' energy conservation measures to be promoted and supported. Also we will endeavor to achieve the widespread use of renewable energies by allowing them to utilize the green power

certificate program.

Through these and other mechanisms we will encourage businesses to carry out top runner's-level activities and facilitate joint efforts by large and small business establishments, thus expanding commitments to climate change mitigation measures.

The Average Greenhouse Gas Reduction Rate under the Tokyo CO_2 Emission Reduction Program (for Fiscal 2005 and 2006)

Source: The Bureau of the Environment, Tokyo Metropolitan Government

Ratings	Number of business establishments	Planned reduction rates			Past reduction measures*
			Basic measures	Target achieving measures	
AA	315	8.7%	2.0%	6.6%	3.5%
A+	330	4.3%	2.1%	2.2%	1.0%
A	610	3.0%	2.6%	0.4%	0.2%
Total	1,255	4.8%	2.3%	2.4%	1.2%

* Past reduction measures: Greenhouse gas reduction measures corresponding to target achieving measures that were completed during the period of three years before the planned period.

○ Promote Smaller Businesses' Energy Conservation Measures through the Introduction of the Environmental Collateralized Bond Obligation (CBO) Program, etc.

- Small and medium-sized enterprises account for about 50% of CO_2 emissions in the industrial and business sectors in Tokyo. Not only large business establishments but smaller businesses are also required to reduce the total amount of CO_2 emissions. Yet these smaller businesses are lagging behind in their efforts to promote energy conservation measures because of insufficient knowledge of such measures and insufficient fund raising ability to invest in energy-saving technologies compared with large businesses.
- In order to encourage the introduction of the latest technologies to ensure that small and medium-sized enterprises are able to save energy, we will introduce a mechanism designed to facilitate and support them in the installation of energy-saving systems and equipment.
- By incorporating a perspective of promoting climate change mitigation strategies in the Collateralized Bond Obligation (CBO) program that has been carried out since March 2003 to provide smaller businesses with a new means of raising funds in accordance with the Tokyo Metropolitan Bond Market Initiative, the Environment CBO Program will be inaugurated in order to promote small and medium businesses' measures to achieve CO_2 reductions. At the same time, a public-private partnership fund will be created under a tieup with financial institutions in order to help smaller businesses promote environmental protection measures.

○ Call Upon Financial Institutions to Expand Environmental Investment and Loan Options and Disclose Information about Investments

- The financing function, which should be called the blood of economic activities, is playing a

very important role in promoting companies' and individuals' activities that care about the environment and in crating a low-energy and low-CO_2 society. From this point of view, we will further expand the environmental financing project that was started in fiscal 2005.

- We will call upon financial institutions to expand environmental investment and loan options by, for example, increasing the availability of funds for smaller businesses to invest in energy-saving technologies and achieve the expanded use of renewable energies, and by providing funds to accelerate environmental protection measures in buildings.
- We will also invite proposals about the way to utilize the Fund for the Promotion of Measures to Cope with Global Warming in cooperation with private funds.
- In keeping with these moves, we will call upon major financial institutions, which have a substantial impact on Tokyo's economic activities, to disclose information about environmental investments and loans offered in the past.

○ Achieve the Widespread Use of Renewable Energies by Promoting the Green Power Purchasing Program

- Tokyo has quite a few pioneering spirited enterprises that are trying voluntarily to expand the use of renewable energies while encouraging energy conservation. In order to further accelerate and expand this trend, a mechanism that justly appreciates these pioneering spirited enterprises' efforts and prevents them from shouldering an excessive monetary burden is needed.
- From this perspective, we will call upon the central government to come up with a proposal that allows the purchasing price of green power, which is now treated as a donation, to be accounted for as an expense under the tax laws in order to help numerous companies use renewable energies more readily.
- Also in cooperation with local governments across the country, we will create a national network of green power purchase in order to accelerate the trend in green power purchase in local governments' facilities.

○ Collaboration in Conjunction with Smoke, Soot and Air Pollution Control Measures

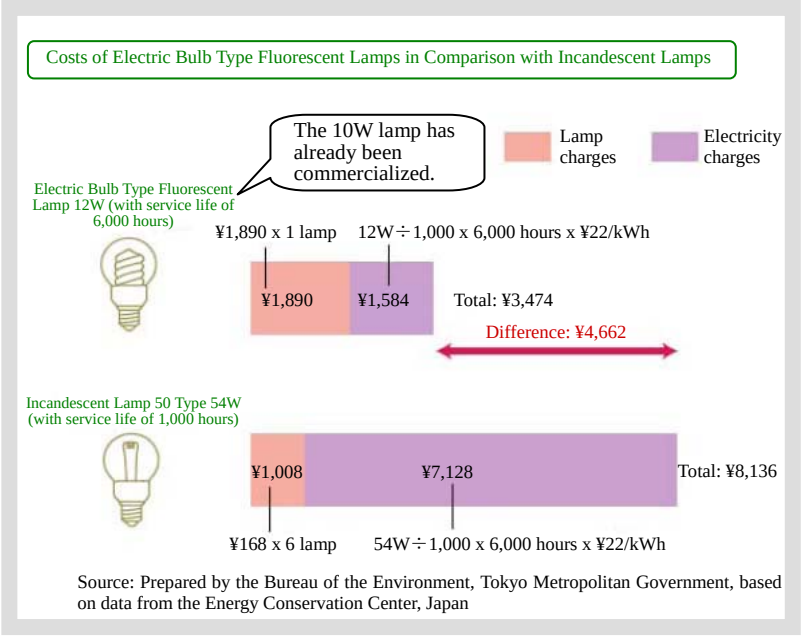
- We will push ahead with energy conservation measures by small and medium-sized businesses through multifaceted approaches, including encouraging energy conservation efforts in conjunction with smoke and soot control measures taken for boilers and other combustion facilities.

Initiative II: Achieve CO_2 Reductions in Households in Earnest - Cut down on light and fuel expenses by low-CO_2 lifestyles

Over the years TMG has carried out a series of energy conservation measures, including the creation of the Energy Efficiency Labeling System of Home Appliances designed to decrease the electricity consumption accounting for about 50% of the energy consumed in households, the Condominium Environmental Performance Indication, and the spread of the educational program for children on the climate change issue. The Energy Efficiency Labeling System of Home Appliances has spread to local governments across the country. It became a national program in October 2006 and is being carried out throughout the country. In addition to these activities, TMG will launch an initiative aimed at reducing the total amount of CO_2 emissions from households in earnest.

○ Wage the "Campaign for Elimination of Incandescent Lamps" from Households

- Lighting accounts for a little fewer than 20% of the electricity consumed in households. Electricity need for lighting can be reduced substantially simply by changing incandescent lamps to electric bulb type fluorescent lamps. A changeover from incandescent lamps to electric bulb type fluorescent lamps achieves the maximum 80% reduction of energy per lamp.
- Although electric bulb type fluorescent lamps are higher-priced than incandescent lamps, they can reduce electricity charges by one-fifth and increase the service life by six times, so electric bulb type fluorescent lamps are rather inexpensive in all aspects.
- Recently the performance of electric bulb type fluorescent lamps has improved to such an extent that the lamp comes on immediately after it is switched on. New products such as a warm colored lamp and a small lamp have been launched one after another.
- We will eliminate incandescent lamps from households as soon as possible by starting a large-scale replacement promotion campaign to eliminate incandescent lamps in cooperation with electric appliance manufacturers, trade organizations and consumer organizations
- With the Campaign for Elimination of Incandescent Lamps as a momentum, we will encourage consumers to turn off electric appliances while not in use, promote the spread of energy-efficient home electric appliances and step up other measures to ensure that "the movement to reduce CO_2 by



Source: Prepared by the Bureau of the Environment, Tokyo Metropolitan Government, based on data from the Energy Conservation Center, Japan

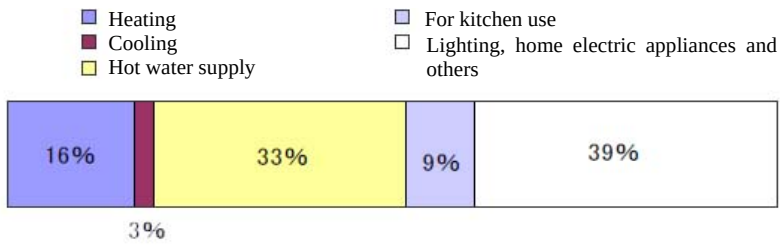
cutting down on electricity charges" spreads among all households.

○ Build a Comfortable House Using Natural Light, Heat and Wind

– Regenerate the Solar Thermal Market

- Much of the demand for energy used in houses for heating and hot water supply is accounted for by demand for not so hot heat and this demand can be supplied by using solar thermal as it is. Moreover, energy demand for air conditioning and lighting can be reduced by leading natural light and wind into houses effectively. Thus we will promote an effort to build a comfortable low-CO_2 house that use natural light, heat and wind as they are.
- As for the use of solar thermal, in particular, the oil crises in the 1970s triggered off the rapid spread of solar thermal water heaters for a brief span of time but due to the maintenance problem these solar thermal water heaters ceased to be used and the number of solar thermal water heaters installed is now decreasing. Today, however, products that have an outstanding heat exchange performance and feature a high quality design are manufactured.
- TMG will encourage the widespread use of solar thermal technology through a set of measures, including creating a mechanism that provides systematic cooperation among solar thermal equipment manufacturers, housing manufacturers and energy suppliers, formulating clear performance standards to promote commodity development, and carrying out a strategy designed to improve the image of solar thermal systems as environmentally sound products.

Percentage Composition of Energy Consumption by Uses in the Residential Sector (FY2004)



Source: The Bureau of the Environment, Tokyo Metropolitan Government

○ Improve the Energy-Saving Performance of Houses

- Newly built houses in Tokyo Metropolitan area that meet the next generation energy conservation standards account for no more than 14% of the total and this level represents less than half the national average. For widespread of low-energy houses, we will promote an effort in cooperation with housing manufacturers and facility manufacturers in order to raise this ratio of achievement to 65% or so by 2015.
- Energy-saving improvements on existing houses not only bring about an improvement of energy-conserving performance but also result in an improvement in comfortableness in housing, such as the installation of double glazed sash windows that produce the sound-proofing effect. With this in mind, we will make an effort in cooperation with housing renovation firms in order to ensure that consumers carry out energy-saving renovations, such as the improved thermal insulation of windows, other openings and outer walls, when they reform existing houses due, for example, to a change in the household composition. At the same time, we will provide advice and suggestions about the benefits of energy-saving renovations that lead to an improvement of dwelling comfortableness for Tokyoites who intend to renovate their houses.

○ Facilitate the Spread of Renewable Energies and Energy-Saving Equipment Such As Photovoltaic Power Generation Systems and High-Efficiency Water Heaters in Houses

- Photovoltaic power generation is the environmental technology in which Japan takes pride. However, because government policy measures have not been established yet to promote the wider use of this generation system, the valuable photovoltaic power generation has not fully utilized in Japan. As a result, Japan lost its first place position in the world in terms of the number of photovoltaic power generation systems installed to Germany.
- In the field of water heaters, high-performance energy-efficient products have been commercialized but these products are yet to come into wider use.
- We will create a mechanism that facilitates the full-scale diffusion of these systems that have a great CO_2 reduction potential in cooperation with equipment manufacturers, housing manufacturers, and energy suppliers.

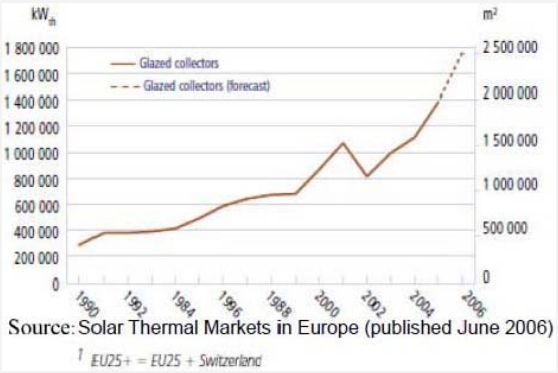
BOX：The Conference on the Expanded Use of Solar Energy

The use of solar energy in the forms of solar thermal and solar light is a particularly high priority project in promoting the use of renewable energies in Tokyo. Accordingly, Tokyo has set up the Conference on the Expanded Use of Solar Energy designed to achieve the use of 1 million kW-class solar energy systems and, with this conference, is considering policy options aimed at introducing solar energy systems mainly in detached houses and apartment houses in cooperation with equipment manufacturers, housing manufacturers, electricity and gas suppliers, and learned persons.

Based on the results of this study, we will facilitate the expanded use of solar energy in houses in Tokyo.

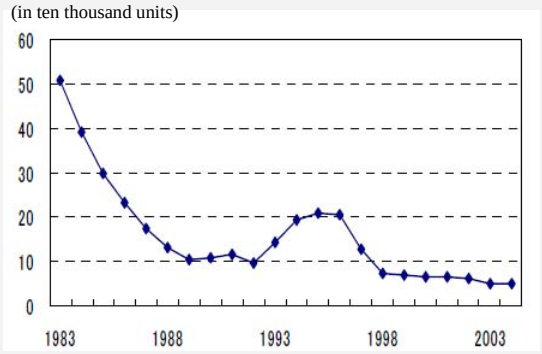
For Reference: Solar thermal markets in the European Union and Japan

■ Changes in the solar thermal market in the European Union



- 26% increase in 2005
- Germany, Austria and Greece together account for 70% of the EU market.
- Increases in local governments and countries imposing the requirement to introduce solar thermal systems at the time of constructing a new house and refurbishing houses on a large scale

■ Changes in the number of solar thermal facilities installed in Japan



Source: Data by the Solar System Development Association

- 500,000 units were installed in 1983 but the number decreased rapidly by the end of the 1980s.
- Approximately 50,000 units were installed in 2004.
- Japan is confronted with a slowdown in the use of solar thermal systems.

Initiative III: Lay Down Rules for CO_2 Reductions in the Urban Development

One of the salient characteristics of urban activities in Tokyo is the progress of active urban development primarily in central Tokyo. Office buildings, apartment houses and other structures that are constructed in these new urban development projects will exist over the next several decades and, as such, the environmental performance of these structures will determine the magnitude of an environmental load in Tokyo for a long period of time.

The framework of Japan's present city planning system does not contain the provisions for energy and CO_2 emission reductions. TMG has therefore been promoting its own pioneering policy measures, including the creation of the Tokyo Green Building Program designed to improve the energy-saving and environmental performance of buildings under the TMG ordinance.

From now on, we will create a mechanism that maximizes CO_2 reductions not only by improving the energy-saving performance through the introduction of the latest high-efficiency equipment but also by developing a low-energy design for buildings through the use of passive energies and through appropriate measures in the operation of buildings, and by utilizing renewable energies and making effective use of energy in local communities.

○ Formulate the World's Highest-Level Energy Conservation Specifications for Buildings and Apply Them to Facilities of Tokyo Metropolitan Government

■ Fully Apply the Tokyo Energy Conservation Design Specifications 2007 to the TMG Facilities in the Current Fiscal Year

- Tokyo Metropolitan Government will lead the way in applying the Tokyo 2007 Energy Conservation Specifications that it has formulated to TMG facilities to be newly constructed, expanded or refurbished on a large scale in order to achieve substantial CO_2 reductions.

  * In the case of a typical TMG building with a floor space of 3,000m², the specifications can reduce CO_2 emissions by approximately 30% (from the 2000 level).

- For example, the newly formulated specifications will increase the thickness of roof thermal insulation material by about 50% (from 50mm to 75mm) and the thickness of outer wall thermal insulating material by two times.

■ Formulate the Guidelines for Energy Conservation and the Introduction of Renewable Energies (a tentative name) in TMG Facilities

- In order to push ahead with the construction of low-energy and low-CO_2 buildings, we must make efforts not only to improve the energy conservation performance of buildings but also to utilize solar light and thermal and underground thermal energy effectively. Some measures in the operation of buildings should also be carried out in order to allow facilities to display their energy-saving capabilities.

- To this end, we will endeavor to improve the energy conservation performance of buildings in accordance with the Tokyo Energy Conservation Design Specifications 2007

in order to expand the utilization of renewable energies, including the direct use of natural light and heat. In addition, we will formulate the Guidelines for Energy Conservation and the Introduction of Renewable Energies (a tentative name) and apply the same to TMG facilities in order to promote measures to be taken in the operation and maintenance of buildings.

- Through these and other measures we will reduce CO_2 emissions directly and encourage the widespread use of renewable energies in administrative organizations and municipal facilities of Tokyo Metropolitan Area.

○ Require Large New Buildings to Have Energy Conservation Performance

- Buildings with outstanding energy conservation performance have come to be constructed since the Tokyo Green Building Program designed to improve the energy conservation performance of large buildings in Tokyo was introduced under the Tokyo Metropolitan Environment Security Ordinance.
- In order to further establish this trend and promote CO_2 reduction measures in new buildings, we will expand the range of buildings under the Tokyo Green Building Program and require buildings to have energy conservation performance higher than the existing requirement level in order to increase the energy conservation performance of new buildings.

○ Introduce the Energy Conservation Performance Certificate Program (a tentative name) for Large New Buildings

- In the category of large condominiums, a simple approach of requiring housing business operators to declare the environmental performance of condominiums in advertisements in accordance with the Condominium Environmental Performance Indication has effectively appealed to end users, thus resulting in the improved environmental performance of condominiums.
- Based on this result, we will introduce the Energy Conservation Performance Certificate Program (a tentative name) to show the environmental performance of new buildings other than condominiums plainly to end users and, under this program, require housing business operators to declare energy conservation performance in the distribution process of new buildings, including purchase and sale, and leasing transactions.

○ Promote the Effective Utilization of Energy and the Use of Renewable Energies in Local Areas

- Urban development projects involving intensive land use create the demand for a large amount of high-density energy in certain areas. Accordingly, it is important to utilize unused energy such as urban waste heat, use energy effectively not only in individual buildings but also in the entire district, and achieve the cutting-edge energy performance.
- From this perspective, we will examine the possibility of introducing a mechanism that allows us to improve the performance of existing energy supply systems and of creating a mechanism to formulate an effective energy utilization plan in the entire district in a stage earlier than the process of shaping an individual construction plan.
- In Tokyo where high-density urban functions are concentrated, energetic urban activities are

producing various forms and large quantities of urban energy, including biomass resources and other renewable energies, and waste heat from sewage treatment facilities and waste treatment facilities. We will also examine options to use these energies effectively.

Initiative IV: Accelerate the Effort to Reduce CO_2 from Vehicle Traffic

CO_2 emissions originating from vehicle traffic account for about 20% of the total emissions in Tokyo Metropolitan Area and 60% of them are emitted by passenger cars. The trend statistics since fiscal 1990 show that CO_2 emissions from trucks continue to decrease while emissions from passenger cars have shown an increase of as much as 30% or so.

The increase in CO_2 emissions from passenger cars far outpaces the emission growth rate for Tokyo as a whole and is well comparable to the rate of increase in the business sector that has registered the highest growth rate by sectors. Thus we will endeavor to reduce CO_2 emissions resulting from vehicle traffic, focusing on passenger vehicles.

○ Formulate the Rules for the Use of Fuel-Efficient Vehicles to Facilitate the Widespread Diffusion of Hybrid Cars

- The fuel efficiency of vehicles, including passenger cars, has improved thanks to the active development of technologies by vehicle manufacturers. Hybrid cars, among others, achieve high fuel efficiency performance that is much higher than those of other categories of vehicles. A look at the hybrid car ownership in Tokyo reveals, however, these hybrid cars account for no more than 0.6%, or 20,000 units, of the 3,280,000 passenger cars registered in the Metropolis. Reducing CO_2 emissions from vehicles from now on requires the full-scale spread of fuel-efficient vehicles represented by hybrid cars.
- With this in mind, we will lay down the rules for the use of fuel-efficient vehicles to ensure that fuel-efficient vehicles are treated preferentially in all the stages of vehicle production, marketing, purchasing and use. By enforcing the rules, we will press ahead with the full-scale spread of fuel-efficient vehicles, including hybrid cars.

○ Implement a Project to Encourage the Introduction of Green Vehicle Fuel Conducive to CO_2 Reductions

- Tokyo already launched a project designed to introduce first- and second-generation biodiesel fuels (BDFs) in the current fiscal year. We also have initiated an effort to achieve the diffusion of bioethanol by designating it as a product that TMG should take the initiative in introducing under the Tokyo Metropolitan Green Purchasing Guideline.
- From now on we will encourage the use of BTL (biomass-to-liquids) made from biomass, and GTL (gas-to-liquids) made from natural gas.

○ Create a Mechanism of Support for Voluntary Activities Such as the Eco-Drive Campaign

- Eco-Drive is highly instrumental in achieving CO_2 reductions as it promotes an environmentally sound vehicle driving and using behavior, preventing one from accelerating or decelerating a vehicle abruptly or idling it for too long a time.
- Large and medium-sized business enterprises are carrying out the Eco-Drive campaign as an

organizational program, while smaller businesses and individuals are lagging behind in promoting this Eco-Drive.

- We will provide advice and suggestions to Tokyoites and smaller business enterprises to arouse their interest in Eco-Drive and establish the eco-driving practice in society. At the same time, we will create a mechanism to provide support for trade associations and other parties in their voluntary efforts to encourage the eco-driving practice.

○ Carry out Traffic Volume Measures by Taking Advantage of the World's Most Refined Public Transportation Facilities

- In order to reduce CO_2 emissions from vehicles substantially, it is necessary to decrease the usage of vehicles by promoting a shift to public transportation facilities, in addition to the spread of fuel-efficiency vehicles, the use of environmentally sound fuels, and the promotion of Eco-Drive.
- Tokyo is equipped with a network of public transportation facilities that are at the highest level among major cities in the world. Taking advantage of this remarkable network, promotion of a departure from excessive dependence on vehicles in urban life and acceleration of a shift from passenger cars to public transportation facilities are a particularly important measure among climate change mitigation strategies in Tokyo.
- Thus we will introduce the park-and-ride system according to days of the week, time zones and traffic conditions and carry out other measures designed to restrain the usage of passenger cars as well as to secure the convenience of transfer and timely availability of public transportation facilities. We will also promote the car-sharing program.

Initiative V: Create TMG's Own Mechanism to Support Activities in the Respective Sectors

Achieving substantial CO_2 reductions in Tokyo and accomplishing a clear shift toward a low-CO_2 society requires a reform in the behaviors of all the people who are living and working in Tokyo and who visit Tokyo.

To this end, we are required to push vigorously ahead with the strategies set forth in the initiatives I to IV. What is particularly needed to step up measures to reduce CO_2 emissions from smaller businesses and households is to create a mechanism that encourages and supports their energy-saving activities.

Financially weak small and medium-sized businesses often find it difficult to continue energy-saving measures because they are unable to raise funds to cover initial investment needed to introduce energy-saving facilities. For similar reasons households often decide against making energy conservation refurbishments in housing or are reluctant to introduce energy-efficient equipment and photovoltaic power generation systems.

In most cases, however, CO_2 reduction measures are "no-regret strategies" that can reduce light and fuel expenses at business establishments and households. As such, we will be able to get economical benefit from these measures for a certain period of time.

We will therefore be able to reduce the total amount of CO_2 emissions from smaller businesses and households as long as we can create a mechanism that would relieve financing bottlenecks through a set of measures. From this perspective, Tokyo Metropolitan Government will endeavor to create its own mechanism to promote and support small businesses' and households' energy-saving activities.

○ Introduce the CO_2 Emission Trading System

- In keeping with the imposition of the obligation to reduce total emissions on large CO_2-emitting business establishments, we aim to institute the emission trading system. We will encourage and support smaller business establishments' energy-saving measures by purchasing emission reductions attained by these smaller businesses through energy conservation activities.

○ Create a Program to Encourage and Support Smaller Businesses' and Households' Energy-Saving Efforts

- We will inaugurate the Environment CBO Program and call upon financial institutions to develop financial products and create new funds to encourage and support small businesses' and households' CO_2 reduction efforts. Also TMG, on its part, will examine ways to allow these new financing means and financial products to become more effective by the use of the Fund to Promote Measures against Climate Change, and promote CO_2 reduction measures being carried out by small businesses
- CO_2 emissions from households can be reduced to a considerable degree by employing already commercialized technologies, such as photovoltaic power generation systems and high-efficiency water heaters. However, because these products now cost a great deal,

their widespread diffusion cannot be achieved simply by the efforts of individuals and specific business enterprises. In order to achieve substantial emission reductions in the residential sector, we will implement a set of measures designed to support the spread of these environmental technologies.

○ Commence a Study both in Terms of Tax Reduction and Taxation to Introduce TMG's Own Energy Conservation Tax Incentive (a study to be conducted by Tokyo Metropolitan Tax Research Council in the Current Fiscal Year)

- In order to effectively promote businesses' and households' energy-saving measures, using economic approaches is effective and the taxation system, among others, has a very important role to play in this regard. A number of policy benefits can be derived from the appropriate utilization of tax options, such as: tax reduction and exemption will stimulate investment in energy-saving systems and the introduction of energy-efficient facilities; taxation will provide an incentive for energy conservation; and a stable revenue resource will step up measures to support small businesses and households.
- While the national government is squandering its time on discussing the issue of introducing an environmental tax, Tokyo Metropolitan Government will start a study by Tokyo Metropolitan Tax Research Council on its own energy conservation tax incentive in the current fiscal year in order to effectively press ahead with a shift to a low-CO_2 society by the use of economic approaches.

TMG Takes the Initiative in "Building A Carbon-Minus City"

- Achieve substantial CO_2 reductions through the full utilization of the world's highest-level energy-saving and renewable energies technologies.
- TMG leads the way in carrying out four "Mechanisms of Utilizing Technologies."

Mechanism 1: Obligation to reduce total emissions
Mechanism 2: Emission trading system
Mechanism 3: Program of encouragement and support for the installation of energy-saving facilities at small businesses and households
Mechanism 4: Energy conservation tax incentives, etc.

Tokyo Metropolitan Government

Creating mechanisms

Obligation to achieve CO_2 emission reductions

〔Utilizing the world's highest-level technologies〕

Mechanism 1:
Requiring large business establishments to reduce the total amount of emissions

Large business establishments

- Upgrading all business establishments' efforts to the top runner's level of activities

[Means to reduce CO_2 emissions]

1. Carry out voluntary reduction measures (active operation measures and the introduction of the latest high-efficiency equipment, etc.)
2. Secure emission reductions through trading (purchasing CO_2 reductions from small business establishments and others)

Fiscal year for the initiation of measures

Fiscal year for the completion of measures

Mechanism 2:
Instituting the emission trading system

* Large business establishments are requested to support smaller business establishments' energy-saving measures.

Allowing business operators to sell emission reductions they have achieved

Smaller business establishments

- Encouraging energy-saving efforts
  - Accelerate the replacement to the latest high-efficiency equipment

Mechanism 3:
Installing energy-saving equipment, etc. and introducing the encouragement and support program

Households

- Promote the construction of low-CO_2 houses
  - Encourage the utilization of solar light and thermal
  - Promote the introduction of high-efficiency water heaters

Mechanism 3:
Installing energy-saving equipment, etc. and introducing the encouragement and support program

Bring forth the vitality of the city by a flow of funds that accelerates the introduction of the highest-level technologies

Commitments to reductions
Introduction of technologies
Financial institutions, tax incentives, etc.

Enhancing the vitality of a new city toward CO_2 reductions

Mechanism 4:

Promoting the introduction of energy-saving technologies at smaller businesses and households

Environmental financing, the Fund to Promote Measures against Climate Change, energy conservation tax incentives, etc.

Achieving greenhouse gas emission reductions without fail

TMG's Pioneering Actions

Tokyo Metropolitan Government will initiate bold reduction actions as Tokyo's largest CO_2 emitter in the initiatives I through V.

- ○ **Apply the Tokyo Energy Conservation Design Specifications 2007 fully to TMG facilities starting in the current fiscal year**
- ○ **Formulate the Guidelines for Energy Conservation and the Introduction of Renewable Energies (a tentative name) in TMG facilities this summer**
- ○ **Create the "National Network of Green Power Purchasing" in collaboration with local governments across the country**
- ○ **Replace all vehicle traffic signals and pedestrian traffic signals in Tokyo with LED signals**
- ○ **Formulate measures designed to reduce CO_2 emissions produced in the procurement process of goods (including public work projects)**
- ○ **Revise the Global Warming Prevention TMG Plan**

In consideration of these actions as well as additional undertakings under the 10-Year Project for a Carbon-Minus Tokyo, we will revise the Global Warming Prevention TMG Plan formulated in fiscal 2005 as a package of climate change mitigation measures that TMG should carry out. We will lead the way in accelerating efforts by private enterprises and other parties by further raising the present reduction target – that is, to reduce greenhouse gas emissions from TMG's administrative operations and activities by 10% from the fiscal 2004 level by fiscal 2009.

Collaboration with Local Governments in the Tokyo Metropolitan Area and Across the Country

Measures against climate change must be carried out not only by TMG but by all the parties across the country. In order to push ahead with the national government's measures, TMG will start action in concert with local governments in the Tokyo Metropolitan area and other areas throughout the country.

- ○ **Deploy the "National Network of Green Power Purchasing" in collaboration with local governments across the country**
- ○ **An initiative in the Tokyo Metropolitan Area (an initiative launched by the Eight Local Government Summit) (May 30, 2007)**

Expanded Use of Renewable Energies for Promotion of an Initiative to Build a Carbon-Minus City

We have exchanged views on the expanded use of renewable energies in order to achieve CO_2 emission reductions and have decided to discuss policy options to promote the procurement of environmentally sound electricity and the spread of these procurement schemes among private business enterprises and others at the Tokyo Metropolitan Area Federation Council.

Pushing Ahead with the Carbon-Minus Movement

■ Raise the "Awareness" of Carbon Minus in Everyday Life and Styles of Work

A shift to a low-CO_2 society can be achieved only if all the parties making up the city are aware of the seriousness of the climate crisis and necessary strategies to deal with the challenge and, based on this recognition, this initiative is carried out with the participation of all Tokyoites, NGOs and business operators.

With this in mind, we will conduct a survey on the effects of climate change and the like in Tokyo Metropolitan Area and raise the awareness of the climate crisis among Tokyoites. Furthermore, we will utilize the occasions of events carried out by TMG bureaus as well as public relations activities, step up collaboration with NGOs and other parties, and further promote educational activities on climate change, including the relationship between lifestyles and CO_2 emissions.

Meanwhile, in order to develop human resources who will be major players in a low-CO_2 society, we will reinforce the environmental learning program on the climate crisis and, at the same time, press ahead with a citizen or community participation project for the introduction of renewable energies.

■ Collaboration with Major Cities of the World

The populations in urban places in the world are expected to account for 60% of the world's total population by 2030. Since with an increase in urban populations, energy consumption in cities continues to increase, cities have a very important role to play in achieving greenhouse gas emission reductions.

TMG will promote climate change mitigation measures by taking advantage of energy-saving technologies that Japan has and encourage collaboration with major cities of the world by, for example, presenting TMG's strategies to these major cities in the world at the Large Cities Climate Leadership Group.

■ Cooperation with Cities in Asia

In order to reduce CO_2 emissions in the world, we must achieve both economic growth and a low-CO_2 society in Asian cities that are expected to attain rapid growth and expansion in energy consumption in the years ahead. Considering that Japan is geographically situated close to Asia and historically has close relations with the region, Tokyo has a vital role to play in disseminating this country's energy-saving technologies to Asian cities.

One of the contributions that Tokyo Metropolitan Government can make to the future of the Earth is that we should furnish Asian cities with experiences involved in numerous environmental contamination problems that TMG has resolved in its urban development process and information about climate change mitigation strategies that TMG is now carrying out. Accordingly, we will extend a helping hand to Asia in its efforts to solve environmental problems in cooperation with the Japan Bank for International Cooperation that has ample experiences involved in environmental projects in developing countries.

Promoting the 10-Year Project for a Carbon-Minus Tokyo

We will carry out measures and strategies set forth in this Tokyo Metropolitan Climate Change Mitigation Strategy in cooperation with private business enterprises, NGOs and other parties concerned, and through other means such as agreements and municipal ordinances.

■ Hold a Stakeholders Meeting

We will hold a stakeholders meeting where business enterprises, NGOs, Tokyoites and researchers gather together to express their views on measures and strategies specified in this Strategy and come up with possibly more effective measures and activities.

■ Examine the Direction of a Revision in the TMG Ordinance and Aims at Revising It in Fiscal 2008

Based on an interim report on the current state of the Tokyo Metropolitan Environmental Master Plan released in May 2007 by Tokyo Metropolitan Environmental Council, the Council will start a study on the direction of a revision in the Tokyo Metropolitan Environment Security Ordinance in order to ensure that the ordinance will be revised in fiscal 2008.

■ Give Shape to the 10-Year Project for a Carbon-Minus Tokyo (Summer – Winter 2007)

In accordance with this Tokyo Climate Change Strategy, we will give shape to the 10-Year Project measures and strategies, such as measures to be carried out boldly in all the segments of Tokyo Metropolitan Government and projects in collaboration with pioneering spirited private businesses and other parties concerned.

* The Fund to Promote Measures against Climate Change will be utilized to push ahead with projects that can be carried out successfully through the intensive and priority infusion of financial resources.
* The 10-Year Project measures and strategies are positioned as programs to be implemented under the Tokyo Metropolitan Environmental Master Plan.

■ Revise the Tokyo Metropolitan Environmental Master Plan (by the end of fiscal 2007)

The Tokyo Metropolitan Environmental Master Plan will be revised with due consideration given to the Tokyo Metropolitan Environmental Council's report on a revision in this master plan as well as to the 10-Year Project initiatives.

Reference Data: CO_2 Emissions and Energy Consumption in Tokyo (tentative values for fiscal 2005)

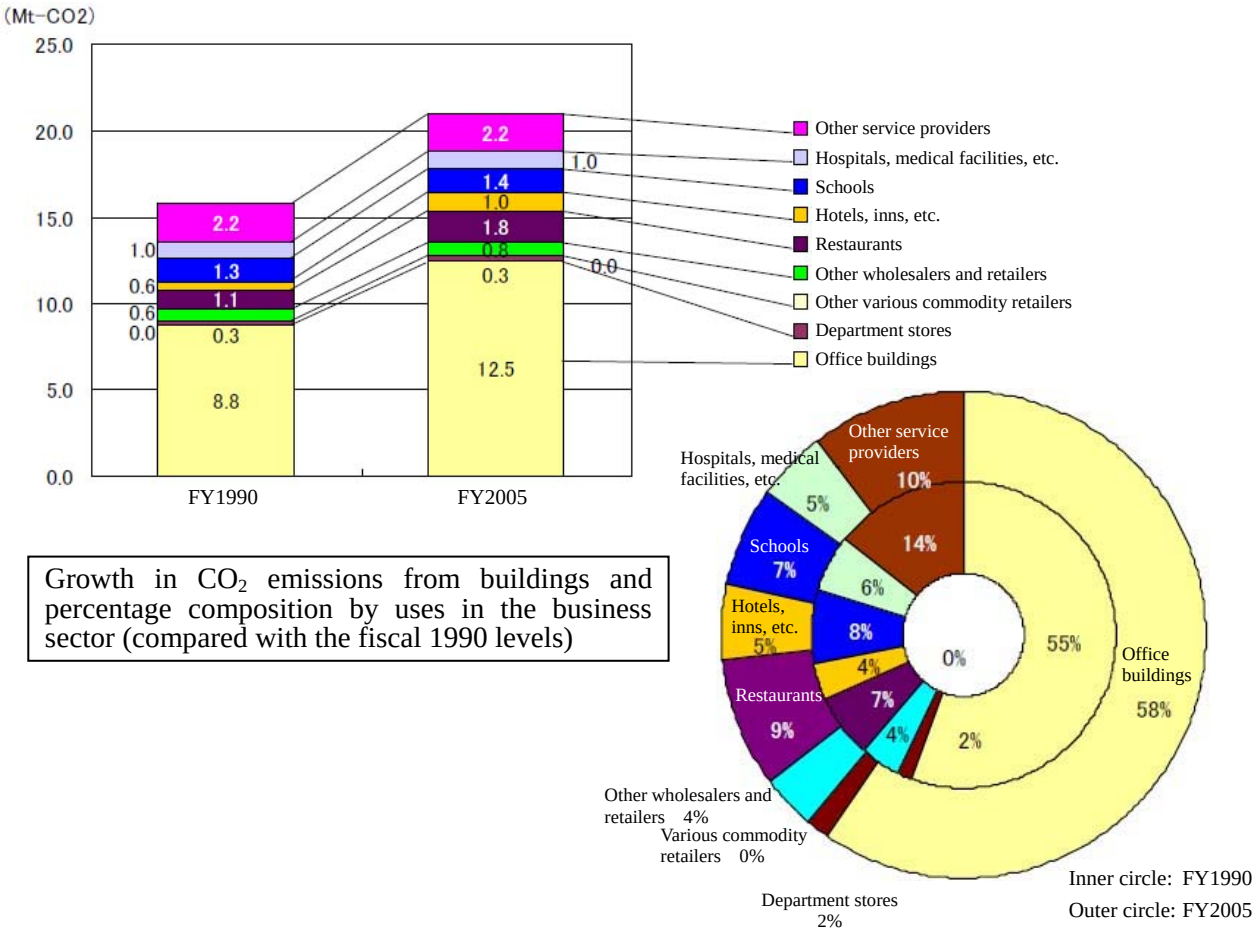
Greenhouse Gas Emissions in Tokyo (tentative values for fiscal 2005)

(supposing that electricity's CO_2 emission factor is fixed at the fiscal 2001 level of 0.318t-CO_2/MWh)

		Emissions (in Mt-CO_2 equivalent)			Growth from base year		Growth from previous year	
		Base year	FY2004	FY2005	Growth rate (%)	Growth amount (Mt-CO_2)	Growth rate (%)	Growth amount (Mt-CO_2)
Carbon dioxide (CO_2)	Industrial sector	9.9	5.4	5.6	-43.4%	-4.3	3.2%	0.2
	Business sector	15.8	20.2	21.0	33.0%	5.2	3.9%	0.8
	Residential sector	13.0	14.2	15.0	15.3%	2.0	6.2%	0.9
	Transport sector	17.9	20.1	19.3	7.7%	1.4	-4.0%	-0.8
	Other	1.0	1.0	1.0	-0.9%	-0.0	1.3%	0.0
	Total for CO_2	57.6	60.8	61.8	7.4%	4.3	1.7%	1.0
Total for other greenhouse gases than CO_2		3.4	2.3	2.2	-36.4%	-1.3	-5.6%	-0.1
Grand total		61.0	63.1	64.0	5.0%	3.0	1.5%	0.9

Energy Consumption in Tokyo Metropolitan Area (tentative values for fiscal 2005)

		Consumption (in PJ equivalent)			Growth from base year		Growth from previous year	
		Base year	FY2004	FY2005	Growth rate (%)	Growth amount (Mt-CO_2)	Growth rate (%)	Growth amount (Mt-CO_2)
Energy consumption (PJ)	Industrial sector	129.1	77.6	81.4	-36.9%	-47.6	5.0%	3.9
	Business sector	182.5	265.3	273.9	50.1%	91.4	3.2%	8.6
	Residential sector	171.8	202.4	216.9	26.3%	45.1	7.1%	14.4
	Transport sector	258.5	295.0	282.8	9.4%	24.3	-4.1%	-12.2
	Energy total	741.9	840.3	855.0	15.3%	113.2	1.7%	14.7



Growth in CO_2 emissions from buildings and percentage composition by uses in the business sector (compared with the fiscal 1990 levels)

Reference: Trends in the World Concerning Climate Change Mitigation Measures

Trends in the World

Specific strategies are beginning to be formulated toward 2020 and 2030.

World's discussion experiences a shift toward medium and long-term efforts beyond the framework of the Kyoto Protocol.

Trends in the European Union

- Approved the Policy for Climate and Energy in March 2007
  - Reduce GHG emissions at least by 20% from the 1990 level by 2020.
  - Raise the share of renewable energies to 20% by 2020.

Trends in the United States

- United States Climate Action Partnership (USCAP), a group of businesses and leading environmental organizations, came forward with a proposal on the obligation to reduce CO_2 emissions in January 2007
  - Introduce the emission trading system and reduce CO_2 emissions by 60-80% from the current level by 2050
- Both Democratic and Republican members of Congress advanced a total of seven bills on the obligation to reduce CO_2 emissions one after another since January 2007
  - Introduce the emission trading system.
  - Democratic and Republican presidential candidates support the bill on the obligation to reduce CO_2 emissions (by 60% by 2050).
- The Federal Supreme Court handed down a ruling that EPA is obliged to regulate CO_2 emissions in April 2007

Trends in Major Cities of the World

California

- Inaugurated the Million Solar Roofs Initiative (2007-2017) with a subsidy of approximately $3.2 billion in January 2006.
- Global Warming Solutions Act signed by governor in September 2006.
  - Reduction target: To reduce greenhouse gas emissions down to the 1990 level by 2020
  - Introduce the obligation to reduce and the emission trading system in January 2012

London

- Announcement of the London Climate Change Action Plan in February 2007
  - Reduction target: To reduce greenhouse gas emissions by 60% from the 1990 level by 2025 (half of this reduction to be achieved through measures implemented by UK and the European Union).
  - Invest approximately £72.5 billion in the housing energy efficiency measures (2005-2008)

New York City

- Announcement of the Cleaner, Greater New York Plan in April 2007
  - Reduction target: To reduce greenhouse gas emissions by 30% from the 2005 level by 2030
  - Use the revenue from a surcharge added on electricity rates to carry out energy conservation measures.
  - Reduce the tax on hybrid vehicles.
  - Introduce the road pricing system on the southern side of Manhattan.

Paris City

- Formulation of the Paris Climate Program in the Summer of 2007 (planned)
  - Reduction target: To reduce greenhouse gas emissions in Paris by one-fourth by 2050